PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Rec'd PCT/PTO 27 SEP 2004

Applicant's or agent's file reference DPPC 133851 MJ	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/BE 03/00055	International filing date *(day/month/year)* 26.03.2003	Priority date *(day/month/year)* 26.03.2002
International Patent Classification (IPC) or both national classification and IPC C11C3/12		
Applicant FUJI OIL EUROPE et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
19.09.2003	19.07.2004
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Georgopoulos, N Telephone No. +49 89 2399-2634

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/BE 03/00055

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-6, 8-39	as originally filed
7, 7a	filed with telefax on 15.04.2004

Claims, Numbers

1-29	filed with telefax on 15.04.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

   see separate sheet

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-6, 8-9, 17-22, 24-26, 29
	No:	Claims	7, 10-16, 23, 27, 28, 30
Inventive step (IS)	Yes:	Claims	1-6, 19-22
	No:	Claims	7-18, 23-30
Industrial applicability (IA)	Yes:	Claims	1-30
	No:	Claims	

2. Citations and explanations

see separate sheet

Item I

1 One of the amendments filed with the telefax of 15.04.04 introduces subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT.

1.1 The amendment concerned is the omission of the formulation " and an increase of C18-0 of less than 1 wt% ... more preferably less than 0.7 wt%" in present claim 1 (see page 8, line 19 to page 9, line 6 of the description as originally filed and originally filed claim 1). Said omission leads to a broadening of the scope of the invention as originally filed.

1.2 Therefore, examination will be carried out on the basis of the originally filed application documents.

Item V

2 Reference is made to the following documents:

D1: US-A-3 686 240
D2: US-A-5 786 019
D3: EP-A-1 040 761

3 The subject-matter of present independent claims 7, 15, 16, 23, 27, 28 and 30 as well as that of present dependent claims 10-14, is not novel (Art.33 (2) PCT).

3.1 D1 discloses a cacao butter substitute (with a TFA content <5 wt% and a SFC behaviour as in present claim 7) and its use in confectionery products such as chocolates (see column 1, lines 31-54; column 2, lines 1-5 and 32-48; column 3, lines 17-28; column 4, lines 41-48; column 4, line 54 to column 5, line 17; figures 1 and 2 and claims 1 and 2 of D1). Thus, said document anticipates the subject-matter of present claims 7, 10-16, 23, 27, 28 and 30.

4 It does not appear that present dependent claims a_1/ 8-9, b_1/ 17-18, c_1/ 24-26 and d_1/ 29, contain technical features that would establish novelty and / or inventive step for the subject-matter of present independent claims a_2/ 7, b_2 / 16, c_2 / 23 or d_2 / 28,

respectively.

5 The subject-matter of present independent claim 1 is novel (Art.33 (2) PCT), for the following reasons:
a/ D1 does not disclose the triglyceride composition of the palm oil fraction that is used in the starting fat composition, the claimed amount of diglycerides or a total content of unsaturated fatty acids of less than 55 wt% (see also the passages mentioned under section 2.1 above);
b/ D2 does not disclose a hydrogenation reaction (but a blending of 3 different types of fat, instead), a S_2U content between 47 and 75 wt% or a diglyceride content as in present claim 1 (see column 1, line 66 to column 2, line 23; column 3, lines 16-23; claims 1, 2, 4, and 10 of D2); and
c/ D3 does not disclose a hydrogenation reaction (an interesterification reaction is instead disclosed), a triglyceride composition as in present claim 1 or a diglyceride content as in present claim 1 (see page 3, lines 14-19 and 24-29; pages 6-10, examples 3-6; claims 1, 2, 4, 5, 7, 10 and 11 of D3).

6 The subject-matter of present independent claim 1 involves an inventive step too (Art.33 (3) PCT), as none of the documents D2 and D3 suggests or discloses how to solve present invention's technical problem over D1 (closest prior art document), i.e. how to provide the composition of a starting fat composition as in present claim 1, which, when subjected to a hydrogenation reaction, does not give a tempering fat but rather a non-tempering fat, having a reasonable TFA content (less than 15 wt%) [see also section 5 above].

7 The subject-matter of present independent claims 19, 20, 21 and 22 is equally novel and inventive over D1-D3, as none of said documents discloses or suggests a water-in-oil emulsion as in present claim 19, the use thereof as in present claim 20, a bakery dough as in present claim 21 or a baked product as in present claim 22 (see also sections 5 and 5.1 above).

8 The subject-matter of present claims 1-30 is susceptible of industrial application in the field of food industry (Art.33 (4) PCT).

9 The applicant's attention is also drawn to the following:

9.1 Contrary to the requirements of Rule 5.1 (a) (ii) PCT, the relevant background art disclosed in the documents D2-D3 is not mentioned in the description, nor are these documents identified therein.

9.2 The expression "and an increase of C18-0 ... more preferably less than 0.4 wt%" in present claim 1 is unclear (it is not clear with respect to what this increase is achieved; Art.6 PCT) and it was not used for the assessment of novelty and inventive step.

9.3 Present claims 16 and 17 are supported by the description (Art.6 PCT) [see page 13, lines 3-8 of the present description].

the same time a similar melting profile and which may be produced at an acceptable cost for this application as well.

1.4. Margarine and bakery products.

Next to the application of fats in confectionery, there is an important use of fats in the preparation of baked goods. Fats employed in bakery dough production may contain high amounts of trans fatty acids, as they are often obtained by partial hydrogenation of liquid oils like soybeanoil, rapeseed oil, sunflowerseedoil, etc. These oils are popular, as they are available in large quantities at attractive prices, and through hydrogenation of the oils a whole range of fats can be produced with different SFC-profiles depending on the texture of the dough one wants to obtain. Hydrogenation not only gives plasticity to the product, but it also increases the stability of the oil. The problem with these liquid oils is however that in the course of the hydrogenation, the high amounts of unsaturated fatty acids present in the raw material, easily isomerise to trans fatty acids. Although these fatty acids provide additional functionality to the fat composition, for example increased crystallisation speed, they are unwanted because of their adverse health effect.

Fats are employed in baking applications as a shortening or as margarine. A shortening can be defined as a functional plastic solid fat prepared by carefully cooling, plasticizing and tempering a blend of molten fats and oils. Margarines relate to a water-in-oil emulsion. Margarines and shortenings have an important functionality in baking: they contribute to the quality of the finished product by imparting a creamy texture and rich flavour, tenderness and uniform aeration for moisture retention and size expansion.

1.5. Prior art.

US-A-5.786.019 solves the problem of providing a fat composition for use in margarine or spreads, which is substantially free of diglycerides and lauric acid containing fatty acids, which is a good structuring fat at both refrigerator and ambient temperature, while showing good melting in the mouth. The fat composition contains 5-45 wt. % of S_2U, 0-60 wt. % of SU_2, 5-95 wt. % of U_3 and 0-8 wt. % of S_3 triglycerides. Such a fat composition is obtained by blending three fat components, a first component of which is obtained by chemical or enzymic interesterification of a liquid oil and a saturated fatty acid, a second component of

Page 7a

which is palm oil stearin, a third component of which may be any liquid oil high in SU_2 + U_3.

EP-A-1.040.761 discloses a process for upgrading fractions of natural fats or oils, which as such are not useful for application in foods, for the preparation of CBE. As these fractions are often too liquid, they are discarded or used in caddle feed. According to EP-A-1.040.761 hardening of these fractions is not suitable for upgrading these products as it will result in a high trans fatty acid content of the improved product. In stead thereof, EP-A-1.040.761 teaches to subject a natural vegetable fat or fat blend with a FAME of 20-50 wt. % of C18:0, 30-60 wt. % of C18:1, 5-15 wt. % of C16:0 and 0-15 wt. % of C18:2 to an interesterification reaction in the presence of a base catalyst. An example of an upgraded randomised fat is interesterified shea oil olein. The randomised fat can be applied as such or be mixed with other facts in view of functioning as a structuring fat therefor.

2. OBJECT OF THE INVENTION.

It is an object of the present invention to provide a fat composition for use as a confectionery fat, which is non-lauric, which is characterised by a steep SFC-profile, which shows a good melting in the mouth without involving waxiness and a sufficiently high crystallisation speed, which has an interesting nutritional profile, i.e. has a low content of trans fatty acids and a

Enclosure 1.

AMENDED SET OF CLAIMS

1. A process for the production of a fat composition suitable as non-tempering confectionery fat or as bakery fat, characterised in that a starting fat composition containing palm oil or a palm oil fraction and having the following composition

(1) a glyceride composition with

- a S_2U content between 47 and 75 wt. %,
- a $SU_2 + U_3$ content < 40 wt. %,
- a S_3 content between 1 and 15 wt. %,
- a diglyceride content of 3 to 12 wt. %,

the glyceride contents being expressed as wt. % with respect to the total amount of di-and triglycerides

in which S means a saturated fatty acid with a hydrocarbon chain length of 14-24 carbon atoms and U means unsaturated fatty acid with a hydrocarbon chain length of 14-24 carbon atoms and

(2) a total content of unsaturated fatty acids of less than 55 wt. %, preferably less than 50 wt. %, more preferably less than 48 wt. %,

is subjected to a catalytic hydrogenation so as to obtain a first fat with a trans fatty acid content < 15 wt. %, preferably < 10 wt. %, most preferably < 5 wt. % and in that the first fat is incorporated in the fat composition.

2. The process of claim 1, characterised in that the starting fat composition has a glyceride composition with

1. a S_2U content between 50-70 wt. %, preferably between 53-65 wt. %,
2. a $SU_2 + U_3$ content between 15- 35 wt. %, preferably between 20-32 wt. %
3. a S_3 content of between 1.5 and 12 wt. %, preferably 2 and 10 wt. %, most preferably between 2.5-7 wt. %.

3. The process of claim 1 or 2, characterised in that the starting fat composition contains a palm oil fraction obtained through fractionation of palm oil or a fraction thereof, the fractionation being either a dry fractionation or detergent fractionation. 4. The process of any one of claims 1-3 characterised in that the hydrogenation reaction is continued until a fat composition is obtained with a difference in iodine value before and after hydrogenation of less than 10, preferably less than 5.

5. The process of any one of claims that the hydrogenation reaction is carried out in the presence of a r containing hydrogenation catalyst.

6. The process of any one of claims that the hydrogenation reaction is carried out at a temperature r≤ 225°C.

7. A **non-tempering** fat compositior method of any one of claims 1-6, characterised in that the fa difference in SFC at 20°C versus 35°C of more than 35%, prefer the SFC being measured according to IUPAC method 2.150 a.

8. A fat composition as claimed in c in that the fat composition has a crystallisation time at 15°C of l≤ 50% of its SFC measured at 15°C.

9. A fat composition as claime characterised in that the composition contains 1-100 wt% of the fir second fat, the second fat having a trans fatty acid content of preferably less than 5 wt. %.

10. A fat composition as claimed in c in that the second fat is a non-hydrogenated fat.

11. A fat composition as claimed characterised in that the second fat has an SFC at 30°C of less th less than 4%.

12. A fat composition as claimed in 11, characterised in that the second fat is a palm fraction or a liqui

13. A fat composition as claimed in 12, characterised in that the second fat is a palm fraction with ≥ 40, preferably > 45, most preferably > 50.

14. Use of the fat composition obtair of any one of claims 1-6, or a fat composition according to any c the preparation of a confectionery product.

15. A confectionery product containi obtainable with the process of any one of claims 1-6, or a fat cor any one of claims 7-13.

5. The process of any one of claims 1-4, characterised in that the hydrogenation reaction is carried out in the presence of a non trans specific Ni-containing hydrogenation catalyst.

6. The process of any one of claims 1-5, characterised in that the hydrogenation reaction is carried out at a temperature ranging between 160-225°C.

7. A **non-tempering** fat composition obtainable with the method of any one of claims 1-6, characterised in that the fat composition has a difference in SFC at 20°C versus 35°C of more than 35%, preferably more than 40%, the SFC being measured according to IUPAC method 2.150 a.

8. A fat composition as claimed in claim 7, characterised in that the fat composition has a crystallisation time at 15°C of less than 15' to reach 50% of its SFC measured at 15°C.

9. A fat composition as claimed in claim 7 or 8, characterised in that the composition contains 1-100 wt% of the first fat and 99-0% of a second fat, the second fat having a trans fatty acid content of less than 10 wt. %, preferably less than 5 wt. %.

10. A fat composition as claimed in claim 9, characterised in that the second fat is a non-hydrogenated fat.

11. A fat composition as claimed in claim 9 or 10, characterised in that the second fat has an SFC at 30°C of less than 7% and at 35°C of less than 4%.

12. A fat composition as claimed in any one of claims 9 - 11, characterised in that the second fat is a palm fraction or a liquid oil.

13. A fat composition as claimed in any one of claims 9 - 12, characterised in that the second fat is a palm fraction with an iodine value above 40, preferably > 45, most preferably > 50.

14. Use of the fat composition obtainable with the process of any one of claims 1-6, or a fat composition according to any one of claims 7-13 for the preparation of a confectionery product.

15. A confectionery product containing the fat composition obtainable with the process of any one of claims 1-6, or a fat composition according to any one of claims 7-13.

16. A confectionery product as claimed in claim 15, characterised in that the confectionery product is selected from the group of a filling and a cream.

17. A confectionery product as claimed in claim 15, characterised in that the confectionery product is a caramel.

18. A water–in-oil emulsion containing 20-85% of fat, characterised in that the fat contains an amount of the fat composition obtainable with the process of any one of claims 1-6, or a fat composition according to any one of claims 7-13.

19. Use of a water-in-oil emulsion according to claim 18 in baking applications.

20. A bakery dough containing an amount of a fat composition obtainable with the process of any one of claims 1-6, or a fat composition according to any one of claims 7-13, and/or a water-in-oil emulsion according to claim 18.

21. Baked product obtained by baking a dough containing a fat composition obtainable with the process of any one of claims 1-6, or a fat composition according to any one of claims 7-13.

22. A confectionery coating fat containing a fat composition obtainable with the process of any one of claims 1-6, or a fat composition according to any one of claims 7-8.

23. A confectionery coating fat according to claim 22, characterised in that the coating fat contains minimum 15 wt %, preferably more than 20 wt % and maximum 100 wt. %, preferably less than 85 wt. %, more preferably less than 75 wt. % of the fat composition obtainable with the process of any one of claims 1-6 or the fat composition according to any one of claims 7-8.

24. A confectionery coating fat as claimed in claim 23, characterised in that the fat comprises an amount of an additional fat having a solid fat content at 20°C of at least 50%, preferably at least 60%.

25. A confectionery coating fat as claimed in claim 24, characterised in that the fat comprises an amount of an additional fat obtained through hydrogenation, fractionation or interesterification, or a combination thereof— and whereby this additional fat is a non-lauric fat.

26. A confectionery coating or tablet containing the confectionery coating fat claimed in any one of claims 22-25.

27. A confectionery fat for hard centres, containing the fat composition obtainable with the process of any one of claims 1-6, or a fat composition according to any one of claims 7-8.

28. A confectionery fat for hard centres, as claimed in claim 27, characterised in that the fat contains less than 25 wt. % with respect to the total amount of glycerides present in the fat, preferably less than 15 wt. %, most preferably less than 10 wt. % of trans fatty acids.

29. A confectionery hard centre containing the confectionery fat according to claim 27 or 28.